CLAIMS

What is claimed is:

1. A method for determining a logical path in a managed network between a source device and a destination device at a data link layer, the method comprising the computer-implemented steps of:

creating and storing a Connected Group Space representation of network devices based on a topology space representation of the network devices;

identifying an optimized path in the Connected Group Space representation;

transforming the optimized path into the topology space representation; and

creating and storing the optimized path that was transformed into the topology space representation as the data link layer path.

2. The method as recited in Claim 1, wherein the managed network is a managed IP network.

3. The method as recited in Claim 1, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying a set of Connected Group nodes associated with the Connected Group Space representation;

identifying Connected Group links that connect the Connected Group nodes; and

creating and storing information that represents the Connected Group links.

4. The method as recited in Claim 1, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying a subnet associated with the source device and the destination device;

determining a set of network links that link one or more network devices in the managed network; and

determining an assignment of ports of network devices.

5. The method as recited in Claim 1, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying all Virtual Local Area Networks (VLANs) associated with a subnet associated with the source device and the destination device; and

identifying all Emulated Local Area Networks (ELANs) associated with the subnet.

6. The method as recited in Claim 1, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

creating one Connected Group node for any pairs of interfaces across a point-to-point link in the topology space representation;

creating one Connected Group node for any interfaces of the managed network that are directly connected by virtue of being on a same physical medium;

creating one Connected Group node for LAN Emulation interfaces on a same Emulated Local Area Network (ELAN);

creating one Connected Group node for each internal interface of any network device when the network device has an internal interface;

creating one Connected Group node for the source device;

creating one Connected Group node for the destination device; and

creating one Connected Group node for each user interface on any network device when the network device has a user interface.

7. The method as recited in Claim 6, further comprising the step of determining Connected Group links between Connected Group nodes in a subnet associated with the source device and the destination device.

8. The method as recited in Claim 7, further comprising the step of creating one Connected Group link for each pair of interfaces within each network device, wherein each interface is associated with the subnet of the source device and the destination device and is in a forwarding state.

9. The method as recited in Claim 8, further comprising the step of checking a spanning tree status for each interface within each network device to determine whether the interface is in the forwarding state.

10. The method as recited in Claim 1, wherein the step of identifying an optimized path in the Connected Group Space representation further comprises the step of finding a shortest path between a Connected Group source node and a Connected Group destination node.

11. The method as recited in Claim 10, further comprising the step of using a Dijkstra algorithm to find the shortest path between the Connected Group source node and the Connected Group destination node.

12. The method as recited in Claim 1, wherein the step of transforming the optimized path into the topology space representation further comprises the steps of:

identifying an ordered set of Connected Group nodes associated with the optimized path; and

identifying an ordered set of Connected Group links associated with the ordered set of Connected Group nodes.

13. The method as recited in Claim 12, further comprising the steps of:

identifying a pair of interfaces associated with each Connected Group link in the ordered set of Connected Group nodes associated with the optimized path; and

generating an ordered set of topology space links from the pairs of interfaces associated with Connected Group links.

14. A computer-readable medium carrying one or more sequences of instructions for determining a logical path in a managed network between a source device and a destination device at a data link layer, wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the steps of:

creating and storing a Connected Group Space representation of network devices based on a topology space representation of the network devices;

identifying an optimized path in the Connected Group Space representation;

transforming the optimized path into the topology space representation; and

creating and storing the optimized path that was transformed into the topology space representation as the data link layer path.

15. The computer-readable medium as recited in Claim 14, wherein the managed network is a managed IP network.

16. The computer-readable medium as recited in Claim 14, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying a set of Connected Group nodes associated with the Connected Group Space representation;

identifying Connected Group links that connect the Connected Group nodes; and

creating and storing information that represents the Connected Group links.

17. The computer-readable medium as recited in Claim 14, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying a subnet associated with the source device and the destination device;

determining a set of network links that link one or more network devices in the managed network; and

determining an assignment of ports of network devices.

18. The computer-readable medium as recited in Claim 14, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

identifying all Virtual Local Area Networks (VLANs) associated with a subnet associated with the source device and the destination device; and

identifying all Emulated Local Area Networks (ELANs) associated with the subnet associated with the source device and the destination device.

19. The computer-readable medium as recited in Claim 14, wherein the step of creating and storing a Connected Group Space representation further comprises the steps of:

creating one Connected Group node for any pairs of interfaces across a point-to-point link in the topology space representation;

creating one Connected Group node for any interfaces of the managed network that are directly connected by virtue of being on a same physical medium;

creating one Connected Group node for LAN Emulation interfaces on a same Emulated Local Area Network (ELAN);

creating one Connected Group node for each internal interface of any network device when the network device has an internal interface;

creating one Connected Group node for the source device;

creating one Connected Group node for the destination device; and

creating one Connected Group node for each user interface on any network device when the network device has a user interface.

20. The computer-readable medium as recited in Claim 19, further comprising the step of determining Connected Group links between Connected Group nodes in a subnet associated with the source device and the destination device.

21. The computer-readable medium as recited in Claim 20, further comprising the step of creating one Connected Group link for each pair of interfaces within each network device, wherein each interface is associated with the subnet of the source device and the destination device, and is in a forwarding state.

22. The computer-readable medium as recited in Claim 21, further comprising the step of checking a spanning tree status for each interface within each network device to determine whether the interface is in the forwarding state.

23. The computer-readable medium as recited in Claim 14, wherein the step of identifying an optimized path in the Connected Group Space representation further

comprises the step of finding a shortest path between a Connected Group source node and a Connected Group destination node.

24. The computer-readable medium as recited in Claim 23, further comprising the step of using a Dijkstra algorithm to find the shortest path between the Connected Group source node and the Connected Group destination node.

25. The computer-readable medium as recited in Claim 14, wherein the step of transforming the optimized path into the topology space representation further comprises the steps of:

identifying an ordered set of Connected Group nodes associated with the optimized path; and

identifying an ordered set of Connected Group links associated with the ordered set of Connected Group nodes.

26. The computer-readable medium as recited in Claim 25, further comprising the steps of:

identifying a pair of interfaces associated with each Connected Group link in the ordered set of Connected Group nodes associated with the optimized path; and

generating an ordered set of topology space links from the pairs of interfaces associated with Connected Group links.

27. A computer data signal embodied in a carrier wave, the computer data signal carrying one or more sequences of instructions for determining a logical path in a managed network between a source device and a destination device at a data link layer, wherein

execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the steps of:

creating and storing a Connected Group Space representation of network devices based on a topology space representation of the network devices;

identifying an optimized path in the Connected Group Space representation;

transforming the optimized path into the topology space representation; and

creating and storing the optimized path that was transformed into the topology space representation as the data link layer path.

28. A computer apparatus comprising:

a processor; and

a memory coupled to the processor, the memory containing one or more sequences of instructions for determining a logical path in a managed network between a source device and a destination device at a data link layer, wherein execution of the one or more sequences of instructions by the processor causes the processor to perform the steps of:

creating and storing a Connected Group Space representation of network devices based on a topology space representation of the network devices;

identifying an optimized path in the Connected Group Space representation;

transforming the optimized path into the topology space representation; and

creating and storing the optimized path that was transformed into the topology space representation as the data link layer path.

Add B>